Space Weather Forecast

Issued on Friday 3 January 2025 at 01:26 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Moderate class flares likely, with a slight chance of Strong class flares. Chance G1 Minor Storms on Day 2 (04 Jan).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Moderate, with one Moderate class flare, peaking 02/1740 UTC from the southern centre disc.

There are thirteen sunspot regions on the Earth-facing disc. While the most active region of late has now rotated of the western limb, it still poses a flare risk for the next 12 hours or so. Some of the previously more magnetically complex sunspot regions on the Earth-facing disc have shown signs of decay over the last 24 hours. Several new spots have develop in the eastern hemisphere in the last 24 hours, these groups are generally simple at this time but may continue to show growth.

No Earth directed Coronal Mass Ejections (CMEs) have been observed in the last 24 hours.

Solar Wind / Geomagnetic Activity: Observed solar winds showed ongoing but waning CME influence. Wind speeds have shown a steady decline elevated to slightly elevated from 530km/s to 460km/s in the period. Interplanetary Magnetic Field, has been largely moderate. The north-south component, was initially weakly positive before becoming weak to moderately negative at 02/0338 UTC. It then returned to weakly positive at 02/1726 UTC.

Geomagnetic activity was generally Active with a G1/Minor Storm interval between 02/0900-1200 UT, trending towards mainly Unsettled.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels with no Solar Radiation Storms observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate solar activity is likely to continue with a slight chance of isolated Strong flares, this risk declining a little as the main active sunspot region rotates away from the west limb.

Solar Wind / Geomagnetic Activity: There is one potential Earth directed CME, which is expected to pass near Earth early on Day 2 (04 Jan), but with low confidence. Solar winds are currently slightly elevated but continuing to ease following the influence of the two CME arrivals on 31 Dec

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and 01 Jan. A connection to fast winds from a coronal hole may then give elevated wind speeds on Days 2-3.

Geomagnetic activity is expected to be Quiet to Unsettled with isolated Active intervals possible during the first half of Day 1 (03 Dec). Any CME arrival on Day 2 (04 Jan) plus any connection to a fast wind from a coronal hole means that it is likely we will see Active intervals with a chance of G1 Minor storm and a slight chance of G2 Moderate storm intervals. Elevated wind speeds may continue into Day 3 (05 Jan), but geomagnetic activity is forecast to tail off.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to persist at background levels with a slight chance of Solar Radiation Storms occurring, this risk declining a little as the main active region rotates well away from the west limb.

Geomagnetic Storms

Geomagnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	5	30	10	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X-Ray Flares

X-Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 (M Class)	Yes	70	60	60	60
Very Active	R3-R5 (X Class)	No	10	10	10	10

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Solar Radiation Storms (High Energy Protons)

Radiation Storms Probability (Exceedance)	Level ($cm^{-2}sr^{-1}s^{-1}$)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	**≥ S1**	No	20	20	15	15
Very Active	**≥ S3 ***	No	5	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and/or 50 MeV ≥ 10pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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